PRELIMINARY STUDY OF THE ORE MINERALS OF THE "AVRAM IANCU" Co-Ni-U ORE DEPOSIT, BIHOR MTS., ROMANIA

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The "Avram Iancu" ore deposit is located on the southern part of the Bihor Mts., *ca*. 2.5-km southward from the Bihor (or Cucurbăta) Peak (1848.5 m). This is a Co-Ni-U type deposit with sulfide ± polymetallic associations. The deposit was explored on different levels on both sides of the uppermost reaches of Arieşul Mic River during the 1950s with Soviet contribution. Our samples from the dump could be correlated with the 1118 m-level of Gallery XI, on the left side of Arieşul Mic.

The ore deposit is found in the retrometamorphic series of the Biharia Nappe. This series consists of two formations. The lower one is built up by chlorite-albite schists, amphibolites and gneisses. The upper formation is a tuffitic carbonate rock, which is the host rock of the ore. It consists of porphyroblastic (albite-) chlorite schists, amphibolites, crystalline limestones and dolomites. The whole series was altered by hydrothermal fluids of Laramian magmatites. The "Avram Iancu" ore deposit has a layered structure, parallel to the foliation of the host rock, but dykes can also be found subordinately. The ores can be classified into three types: a U-Co-Ni, a chalcopyrite-pyrite-magnetite, and a Pb-Zn-Cu type.

X-ray powder diffraction (XRD) and energy-dispersive microprobe measurements were carried out on a dominantly Ni-bearing, and on a dominantly Co-bearing sample from the U-Co-Ni type ore. The following minerals were found: nickeline, skutterudite, cobaltite, gersdorffite, annabergite, erythrite, pyrite, chalcopyrite, galena, rutile, brannerite, uraninite, quartz, zircon, clinochlore, talc, albite, illite (10 Å clay mineral), dolomite or ankerite and a (Ca, Fe, Co) arsenate. This is the first report of brannerite (UTi_2O_6) from the locality. It forms minute (*ca*. 10 μm), isometric inclusions in cobaltite. Uraninite was found in quartz.

According to textural observations, ore formation started with nickeline, the most Ni-rich phase and continued gradually by the formation of more and more Co-rich phases. In the next stage an As-rich gersdorffite–nickel-skutterudite-like phase formed. This was followed by the formation of cobaltite together with skutterudite. Cobaltite is a Ni-bearing, As-rich variety, with a small amount of Fe. The skutterudite appears as 20 μm inclusions in a zone of an euhedral cobaltite crystal.

Annabergite and erythrite are the main alteration phases identified by XRD. Annabergite was found in veins, which cut both the gersdorffite–cobaltite ore and the quartz gangue. Near to some of the cracks of cobaltite a secondary (Ca, Fe, Co) arsenate was found as alteration product.

Silicate minerals of the Ni-rich sample included quartz, talc, chlorite accompanied by dolomite or ankerite. The Co-rich sample contained quartz, chlorite, talc, albite and illite (10 Å clay mineral). A few euhedral rutile inclusions (max. 300 μm in length) can be found in the quartz. A zircon crystal has also been found as 20 μm, euhedral inclusion in cobaltite.

Further investigations are planned for the identification of the uncertain phases.